The Farmer Field School Approach – History, Global Assessment and Success Stories

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List of abbreviations and acronyms

AsDB	Asian Development Bank
ASPS	Agricultural Sector Programme Support

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[To be prepared]

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Executive Summary

1. [To be prepared]

1. The history of the farmer field school approach

This section discusses the history of the farmer field school approach, including origin and emergence, characteristics and evolution of the approach, and the current global status.

Origin and emergence

The Farmer Field School (FFS) approach emerged out of a concrete, immediate problem. At the end of the eighties of the last century farmers in Indonesia were putting their crops, their health and their environment at severe risk through massive abuse of highly toxic pesticides promoted aggressively by the private industry and government. Pest species were becoming resistant and in some cases resurgent. What was called for was a large-scale decentralised programme of education for farmers wherein they become "experts" in managing the ecology of their fields – bringing better yields, fewer problems, increased profits and less risk to their health and environment (Dilts, 2001). The Integrated Pest Management Farmer Field School (IPM-FFS) and a corresponding large-scale Indonesian programme were developed in response to these conditions. The genesis of integrated pest management (IPM) was a response to the emergence of problems associated with the reliance on chemical controls for insect pests by governments, extension systems and farmers. The search for solutions to these problems led to the development of a more holistic view of what constituted an agro-ecosystem and how human interventions could either enhance or disrupt one. FFS alumni are able to not only apply IPM principles in their fields, but also to master a process enabling them to help others learn and apply IPM principles, and organise collaborative activities in their communities to institutionalise IPM principles. A good farmer field school process ensures these outcomes. The educational concepts underpinning the FFS approach are drawn from adult non-formal education. These concepts have been found to be relevant across the many countries and cultures in which the FFS approach has been used, and have proven to be empowering for farmers.

One of the biggest problems with many of the developments in IPM over the years has been the tendency to generalise and make recommendations for farmers across large and highly heterogeneous areas. This has been true for all types of input recommendations including fertilisers, pesticides and rice varieties. This problem, ecological heterogeneity, has also severely limited the effectiveness of government monitoring and forecasting systems. All of these practical issues vary on a small spatial scale. This local specificity requires that farmers become (IPM) experts. The main crop protection approaches since the late 1960s, from the perspective of donor support, are presented in Table 1. The recommendations or decision criteria of each approach reveal a steady progression in the accommodation of ecological heterogeneity and farmer control of agro-ecosystem management.

Governments across Asia have enacted policy in support of one or more of the four approaches presented above. Some countries have supported each of the approaches over the last four decades, often using more than one approach at the same time. Countries have often adopted new approaches without abandoning old approaches, despite glaring contradictions. Presented in roughly chronological order of emergence from left to right, these four approaches place an increasingly larger burden on the user in terms of ecological knowledge, observation and analysis. Each successive approach requires more data for decision-making and the decisions made cover increasingly smaller units of area and time. This increased precision in decision-making, not surprisingly, has led to better control of insect pests and reduced use of pesticides. The FFS approach was designed to address the problem of ecological heterogeneity and local specificity by placing the control of small-scale agro-ecosystems in the hands of the people who manage them (Pontius et al., 2002).

The first wave of FFS was conducted in 1989 in the rice fields of Indonesia. This involved 200 FFSs in four districts of Yogyakarta initiated by the Indonesian National IPM Programme with funds from the Government of Indonesia – United States Agency for International

Development (GoI-USAID) and technical assistance from Food and Agriculture Organization of the United Nations (FAO). By 1990, the Indonesian National IPM Programme scaled up and launched 1,800 FFSs for rice IPM in six provinces in Java, Sumatra and South Sulawesi. Around 1991, the pilot FFSs in IPM for rotation crops (mainly soybeans) was initiated while the FFS Programme spread out to different countries in Asia (CIP-UPWARD, 2003).

Table 1. Pest control approaches in tropical irrigated rice (Pontius et al., 2002)

Calendar-based applications	Surveillance systems	ETL-based decisions by farmers	Farmers as IPM experts
Farmers, in this approach, apply insecticides based on number of days post-sowing or transplanting. Goal: prophylactic control of pest populations. Relies on broad recommendations and assumes homogeneity among planting conditions. Developed in 1960s.	Usually an activity of agriculuture departments. Based on ETLs developed at national level to be applied in widely differing conditions. Goal: insure national yield targets achieved by usiung professional pest control agents. Emerged in 1970s as pesponse to massive pest outbreaks.	The count-and-spray approach relies on use of criteria that assumes homogeneity across all local agro-ecosystems. Goal: employ control tactics at predetermined pest population levels to avoid population levels to avoid economic loss. ETLs appeared with advent of surveillance systems, promoted to farmers in 1980s.	Farmers as decision makers; decision based on analysis of agro-ecosystem[1]. Goal: farmers as IPM experts taking action based on analysis of their agro-ecosystem; pesticide-free rice production. FFSs introduced in 1990, has led to a rapid growth in number of farmer IPM experts.

Approach

Central to the popularity of FFS programmes is an appropriate topic and methodological training of the people who organise and facilitate farmer field schools. To be a successful FFS trainer/facilitator, one must have skills in managing participatory, discovery-based learning as well as technical knowledge to guide the groups' learning and action process. Without an adequate training of trainers (ToT) programme, the subsequent FFS programme will fall far of its potential (Luther et al., 2005). Season-long in-house (residential), and field-based, training-of-trainers courses in which all activities should follow an experiential learning approach have proven to be an effective model for building the required technical capacity of trainers and for changing their attutudes towards that of facilitators of bottom-up change, whereby previous extension methodologies and lecture-type approaches conflicting with the FFS approach had to be essentially 'unlearned'.

In general, farmer field schools consist of groups of people with a common interest, who get together on a regular basis to study the "*how and why*" of a particular topic. The farmer field school is particularly suited and specifically developed for field studies, where hands-on management skills and conceptual understanding (based on non-formal adult education principles) is required. So what are the essential and original elements of a farmer field school? Below is a list of elements that commonly appear in the generic FFS approach[2]:

The group. A group of people with a common interest form the core of the farmer field school. The group may be mixed with men and women together, or separated, depending on culture and topic. The group could be an established one, such as self-help, women's, or

[1] In Agroecosystem Analysis (AESA) in the classical FFS, crop growth stages, presence and abundance of pests and beneficial insects, weather, soil and overall crop conditions in contrasting plots in a FFS, are recorded by farmers each week on a poster - a large piece of paper – using skethches and symbols. The purpose of the drawing is to stimulate close observation of ecological and climate features that stimulate the crop. See Box 2 for a typical AESA in rice.

[2] Adapted from Gallagher (2003). These elements present the main elements of the approach that were present when it was developed in 1989 and are still in use during current FFS implementation.

youth groups. Participatory technology groups, for example, sometimes undertake a season of study in FFSs before starting their research. The FFS tends to strengthen existing groups or may lead to the formation of new groups. Some FFS groups do not continue after the study period. The FFS is not developed with the intention of creating a long-term organisation - although it often becomes one.

The field. FFSs are about practical, hands-on topics. In the FFS, the field is the teacher, and it provides most of the training materials like plants, pests, soil particles and real problems. Any new "language" learned in the course of the studies can be applied directly to real objects, and local names can be used and agreed on. Farmers are usually much more comfortable in field situations than in classrooms. In most cases, communities can provide a study site with a shaded area for follow-up discussions.

Box 1. A typical FFS session in the original Indonesia setting (Gallagher, 2003)

8:00	Opening (often with prayer) Attendance call Day's briefing of activities Stretching exercises
8:30	Go to the field in small teams Make observations that are noted by the facilitator and one other person in the group records. Facilitator points out interesting new developments
9:30	Return to shade. Begin making agro-ecosystem analysis (see box 2) drawing and discuss management decisions.
10:15	Each team presents results and the group arrives at a consensus on management needs for the coming week.
11:00	Short tea/coffee/water break
11:15	Energiser or group building exercise
11:30	Special study topic or second crop/livestock study. This could include nutrition, or chicken or parasites, or something else of special interest to group.
12:30	Closing (often with prayer).

The facilitator. Each FFS needs a technically competent facilitator to lead members through the hands-on exercises. There is no lecturing involved, so the facilitator can be an extension officer or a Farmer Field School graduate. Extension officers with different organisational backgrounds, for example government, NGOs and private companies, have all been involved in FFS. In most programmes, a key objective is to move towards farmer facilitators, because they are often better facilitators than outside extension staff - they know the community and its members, speak a similar language, are recognised by members as colleagues, and know the area well. From a financial perspective, farmer facilitators require less transport and other financial support than formal extensionists. They can also operate more independently (and therefore cheaply), outside formal hierarchical structures.

All facilitators need training. Extension facilitators need season-long training to (re)learn facilitation skills, learn to grow crops with their own hands, and develop management skills such as fund-raising and development of local programmes. Computer literacy is often included in the training of facilitators, especially for preparing local training materials, budgets and project proposals. Email is also becoming more widely available. Once the facilitators have completed their training and are leading the FFS process, it is easy to identify capable farmers who are interested in becoming facilitators. Farmer Field School graduates are usually given special farmer facilitator training (10-14 days) to improve technical, facilitation and organisational skills.

The curriculum. The FFS curriculum follows the natural cycle of its subject, be it crop, animal, soil, or handicrafts. For example, the cycle may be "seed to seed" or "egg to egg". This approach allows all aspects of the subject to be covered, in parallel with what is happening in the FFS member's field. For example, rice transplanting in the FFS takes place at the same time as farmers are transplanting their own crops - the lessons learned can be applied directly. One key factor in the success of the FFS has been that there are no lectures –

all activities are based on experiential (learning-by-doing), participatory, hands-on work. This builds on adult learning theory and practice. Each activity has a procedure for action, observation, analysis and decision-making. The emphasis is not only on "how" but also on

"why". Experience has shown that structured, hands-on activities provide a sound basis for continued innovation and local adaptation, after the FFS itself has been completed. It is also one of the main reasons that farmer facilitators can easily run FFSs - once they know how to facilitate an activity, the outcomes become obvious from the exercise itself.

Activities are sometimes season-long experiments – especially those related to soils or plant physiology (for example soil or variety trials, plant compensation trials). Other activities in

Box 2. AESA in a typical FFS for rice (Gallagher, 2003)

The basic format of an IPM Farmer Field School consists of three activities: agro-ecosystem observation, analysis, and presentation of results; a "special topic"; and a "group dynamics" activity.

The Agro-Ecosystem Analysis (AESA) is the FFS's core activity, and other activities are designed to support it. The agro-ecosystem analysis process sharpens farmers skills in the areas of observation and decision-making, and helps develop their powers of critical thinking. The process begins with small group observation of the IPM and non-IPM plots. During the observation process participants collect field data such as the number of tillers per hill, the varieties of insects and their populations and samples of insects and plants. These data are collected from ten rice hills. The facilitator is present throughout the observation to help participants in their observations.

Following the field observation, the farmers return to the meeting place and, using crayons, draw what they have just observed in the fields on a large piece of newsprint or poster paper. The drawings include:

a) pests and natural enemies observed in the fields (pests on one side, natural enemies on the other);
b) the plant (or animal) indicating the size and stage of growth, along with other important growth features such as the number of stems/tillers, the colour of the plant and any visible damage;
c) important features of the environment (the water level in the field, sunlight, shade trees, weeds, and inputs).

All members of the small groups are involved in the creation of the drawing and data analysis. While drawing, farmers discuss and analyse the data they have collected. Based on their analysis they determine a set of management decisions to be carried out in the field. A summary of these management decisions as agreed by the group is also included in the drawing.

One member of each small group then presents these findings and decisions to the larger group. After this brief presentation of results there is time for open questions and discussion. Good large group discussions often involve posing alternative scenarios, for example, questions such as "What would you do if...." This cycle of presentation, question, answer and discussion is repeated until all the small groups have presented their results. Agroecosystem drawings from previous weeks are kept on hand as a reference and as material for discussion later in the season.

The role of the facilitator is central to the EASA process. In the field, they will guide participants to see what they may not have seen before, such as tiny predators or changes in soil. To ensure a balanced and participatory discussion, a good facilitator understands that the more participants talk, the more they learn, and encourages discussion rather than lecturing. During presentations, the facilitator ensures that all participants have an opportunity to present during the season, and that the group covers all the important issues. The facilitator needs farming and technical skills and needs to know how to ask good questions, guide participants through exercises and ensure that sound management decisions are taken by the group by introducing new information when appropriate.

the curriculum include 30-120 minutes for specific topics. Icebreakers, energisers, and team/organisation building exercises are also included in each session. The curriculum of many FFSs is combined with other topics. In Kenya, for example, the FFSs follow a one-year cycle including cash crops, food crops, chickens or goats and special topics on nutrition, HIV/AIDS, water sanitation and marketing. FFSs for literacy are also promoted where there is a need.

The programme leader. Most FFS programmes exist within a larger programme, run by government or a civil society organisation. It is essential to have a good programme leader who can support the training of facilitators, get materials organised for the field, solve problems in participatory ways and nurture field staff facilitators. This person needs to keep a close watch on the FFSs for potential technical or human relations problems. They are also the person likely to be responsible for monitoring and evaluation. The programme leader must be a good leader and an empowering person. He or she is the key to successful programme development and needs support and training to develop the necessary skills.

Financing. FFSs need such sort of financing to support the group learning activities. They can be expensive or low-cost, depending on who implements them and how they are conducted.

Due to high allowances, transportation costs and several layers of supervision programmes, they can end up being expensive (about US$30-50 per farmer). Obviously, the greater the distance that facilitators need to travel to get to the field, the higher the cost of transport. Transport is one of the biggest costs in any extension programme. However, in FFS programmes training is a key recurrent component, which takes up a large portion of the budget. When the FFS is carried out by local organisations and farmer facilitators, initial start-up costs may be moderate, but the running costs will be much lower (about US$1-20 per farmer). A trend in East Africa is to manage small commercial plots alongside the FFS study plots, so that the FFS can actually raise more funds than it uses for inputs and stationery. In some cases in East Africa farmers have also cost-shared training expenses by buying their own exercise books, offering training sites and other locally available training materials (e.g. planting materials and labour).

Evolution

The topics covered in Farmer Field Schools can vary considerably – originally it was IPM in rice, now organic agriculture, animal husbandry, soil husbandry, groundwater management, human health, to income-generating activities such as handicrafts.

From 1991 to 1994, with support from the FAO Inter-country IPM Programme, rice IPM-FFSs spread from Indonesia to Bangladesh, Cambodia, China, India, Lao PDR, Philippines, Sri Lanka and Vietnam. During this period, the FFS Programme moved from its single-crop focus to include secondary or rotation crops within the rice-based systems and also vegetables in both low and highland systems. NGOs also became involved in further spreading and developing FFS approaches: CARE Bangladesh developed such things as rice-fish IPM-FFS; Thai Education pioneered "IPM in Schools"; and World Education Indonesia promoted farmer adaptive research approaches. These and other innovations including gender advocacy, health impact studies, field ecology, farmer-led action research and farmer planning were taken up by FAO and national programmes in order to strengthen and deepen the FFS model (CIP-UPWARD, 2003).

In 1990, an initiative of farmers who graduated from the first round of FFS, resulted in the fist Farmer-to-Farmer FFS in Indonesia being started and by 1993, Farmer-to-Farmer FFSs were established in Bangladesh, Cambodia and Vietnam. From 1995 to 1999, the Farmer-to-Farmer Programme took roots in China, Lao PDR, Nepal and Sri Lanka (CIP-UPWARD, 2003) and a farmer-led FFS is now a standard element in most FFS programmes around the world.

As a result of the popularity of the IPM-FFSs in Asia, there was a strong movement to copy and adapt the approach to other situations. The concept has now developed far beyond IPM in rice. FFSs are now active in Asia, Sub-Saharan Africa, Latin America and the Caribbean, Near East and North Africa, and Central and Eastern Europe, and since short also in the United States and Western Europe (Denmark), reaching a total of 87 countries by 2008 (Table $$$). Further spread has taken place with the focus of the FFS moving from primarily rice IPM in Asia to vegetable and cotton IPM (Ooi, 2003) in Asia to potato IPM in Latin America, cotton, rice, tree crops (cocoa) and vegetable IPPM in Africa, vegetable and fruit IPPM in the Middle East, the control of Western Corn Rootworm - a quarantine pest (Jiggins et al., 2005) - in maize in Eastern and Central Europe and now towards mixed systems in East Africa with crops, poultry and dairy cows (LEISA, 2003a and 2003b; AGRIDAPE, 2003; CIP-UPWARD, 2003). Agricultural topics in the context of FFSs that do not follow a specific crop developed more recently include soil fertility management (Mureithi et al., 2003; Rijpma et al., 2003), land and water management (Rusike et al., 2004; Hughes and Venema, 2005; FAO/IIRR, 2008), groundwater management (APFAMGS, 2004-8), conservation agriculture, land degradation, agroforestry (Ochoa, 2003), food security, nutrition, fishing (Bartley et al., 2004) and biodiversity (PEDIGREA, 2003-7; Meijerink et al., 2005). More and more topics are outside the agricultural field, which include integrated vector management (Van den Berg and Knols, 2006), community forestry (Miagostovich, 2004), FFSs networks for marketing (Khisa and Heinemann, 2004), health and HIV/AIDS through Farmer Life Schools (Vuthang,

2003; Chayya et al., 2004) and Junior Farmer Field and Life School (FAO, 200X) and FFSs for illiterates and advocacy (Rahadi and Widagdo, 2003).

Waves of adaptations in FFSs have occurred from a focus on a single constraint (pest management) of a single crop (rice) to an emphasis on the multiple dimensions of crop management to cropping systems to resource management to socio-cultural dimensions of community life. This may be seen as the natural progression of the FFS; the phasing or timing by which particular FFSs would evolve to multi-dimensional and/or higher-level concern is for the groups itself to determine (CIP-UPWARD, 2003).

The report of the international FFS Learning Workshop (CIP-UPWARD, 2003) presents a good overview of FFS adaptations and institutionalisation.

Current Global Status of Farmer Field Schools

An overview of the global status of FFSs is difficult to obtain since many different organisations have implemented FFS in over 87 different countries. Braun et al. (2005) carried out a Farmer Field School global survey in 2005 – this study was used as a reference to judge the current global status with some additional information and details for the period 2005-2008. Based on the Global Survey of 2005 a rough estimation is that by 2008 10-20 million farmers have graduated from Farmer Field Schools globally.
FFSs are active in Asia (including East, South-East, South, Central and Middle East), Africa (Western, Southern, Eastern and Central), Latin America (South and Central America), the Caribbean, Eastern Europe and recently in Western Europe (Denmark) and the USA (Table 2). The geographic spread has been accompanied by local cultural and socio-economic adaptations by local facilitators. In the case of moving from Asia to Africa, the focus moved from IPM to Integrated Production and Pest Management (IPPM) due to an emphasis on production and already low levels of pesticide use in most crops since structural adjustments took place.

Asia

As noted in section 1, FFSs originated in Indonesia, and have subsequently spread to many institutions in Asia, including the governmental extension programmes of various countries and national and international NGOs across the continent. The application of the FFS approach beyond IPM has perhaps diversified most in Asia, with it being applied to community forest management in Nepal (Miagostovich, 2004), gender issues in Indonesia (Fakih, 2002), HIV/AIDS in Cambodia (Yech, 2003), women's self-help groups in India (Tripathi and Wajih, 2003), and a variety of other areas.

Evolution of FFSs in Asian FAO Programmes and Community IPM

The FAO South and South-East Asian Rice IPM Project coordinated by Peter Kenmore from 1982 to 1997 worked to bring IPM to rice farmers during a period when massive pesticide subsidies encouraged over-spraying and the occurrence of the release of a secondary pest, the rice brown planthopper, which caused widespread production losses across Asia. This project focused on removing subsidies for the un-needed rice pesticides as well as promoting farmer education on a large scale. Field training was widely tested and successful in Sri Lanka and the Philippines for farmers and policy makers to understand the role of natural enemies and the disruption caused by pesticides. This training was linked to policy change and – combined with data from national researchers and farmer IPM studies – had a large impact. The Presidential Instruction by President Suharto in 1986 was perhaps the best known of these changes; it entailed banning 57 pesticides and subsequently removing annual subsidies of US$150 million for rice pesticides. However, policy changes in India, Bangladesh, the Philippines and other Asian countries also helped to reduce the threat of secondary pest outbreaks.

Large-scale FFS programmes emerged first in the case of the Indonesia National IPM Programme on Rice, which was later expanded to vegetables and estate crops under various

national programmes. FFSs were originally designed to fit into the predominant training and visitation system with a few improvements including a hands-on practical field-based curriculum, extension staff as facilitators (rather than being expected to be experts in all fields), and farmer-managed learning plots instead of demonstrations. The learning activities were built on solid adult education principles and led to large-scale implementation of rice IPM. The FFS process has subsequently been adapted to numerous crops and study areas in Indonesia.

The Indonesian experience was followed by expansion and innovations in Vietnam, the Philippines, Thailand, Bangladesh, India and China. Coverage of these national programmes, in terms of proportion of total farmer households directly involved in the FFS, remained rather small, estimated from 1-5%. Eventually, the FFS was no longer only for learning about IPM. Driven by farmer and donor demand for greater sustainability and wider impact, FFSs evolved under the leadership of Russ Dilts and the FAO Inter-Country IPM Programme towards "community IPM" under which the wider livelihood issues of IPM were explicitly developed around FFSs for education but also farmers' fora and community associations for focusing on social capital development and dealing with environmental, health and local policy issues related to pesticides and IPM (Pontius et al., 2002). Several of the "national" projects have not continued after the end of this regional programme, but nevertheless, national and local farmers' associations are reportedly still active to date, which is indicative of the sustainable nature of community IPM. Institutionally, NGOs have taken the place of the FAO programmes in many of the countries (e.g. FIELD Indonesia, Srer Khmer in Cambodia), even though they also depend largely on donor funding.

Table 3. Summary data of FFS implementation in Asia for the period 1989-2005 (Source: Braun et al., 2005)

Country	Start Year	Facilitators/ Trainers	Farmers trained	FFS
Afghanistan	2005	$$$	$$$	$$$
Bangladesh	1994	~20,000	~650,000	~31,000
Bhutan	2004	15	176	11
Cambodia	1996	~2,950	~92,000	>1,550
China	1993	~2,500	~130,000	~4,000
Indonesia	1989	>30,000	>1,100,000	>48,000
India	1994	>31,000	>255,000	>8,700
Laos PDR	1997	201	ncda	~768
Nepal	1998	619	57,050	2,282
Pakistan	1997	>480	>13,000	>525
Philippines	1993	>4,000	>520,000	>14,000
Sri Lanka	1995	102	45,107	2,453
Thailand	1998	352	74,585	2,985
Vietnam	1992	7,210	930,000	33,400

NGOs in Asia

Numerous international and national NGOs in Asia have been conducting FFSs since the 1990s. World Education coordinated and funded a network of Indonesian NGOs to conduct FFS projects beginning in the early 1990s. This network included such NGOs as Gema Desa in Lampung, and Gita Pertiwi and the Institute for Rural Technology Development (LPTP) in Central Java. With small budgets, these NGOs have been able to conduct FFS projects that have involved substantial numbers of farmers.

LPTP built its programme by hiring farmers who were FFS alumni to become full-time FFS facilitators. Besides training them in participatory methods and technical aspects of IPM, the NGO also facilitated their learning of other new skills, such as how to use computers. LPTP responded to village needs; in one village where almost all the younger and middle-aged men migrate to the city to work about 10 months of the year and the women therefore do a large share of the farming, LPTP facilitated an all-womens' soybean FFS. Participants ranged from teenagers to those in their 60s, and the older women showed as much enthusiasm for learning as the younger ones. Another valuable practice of LPTPs is to transport FFS alumni to other villages and facilitate discussions among farmers so useful technologies can spread more quickly.

CARE–Bangladesh has conducted large FFS projects, which have trained hundreds of thousands of Bangladeshi farmers. CARE integrated fish culture and rice IPM in the FFS curriculum for its INTERFISH project. NO PEST has also been a large IPM-FFS project, which focuses on rice and vegetable crops. However, Bartlett (23) reported that concessions in the training curriculum lead to inadequate opportunities for experiential learning by farmers, which was mainly caused by the top-down management and extension style.

Recent adaptations and developments

Following the rice and vegetable programmes in Asia, between 1999-2004 FAO implemented a cotton IPM programme in six countries in Asia (Ooi et al., 2004). In India a number of state governments, realizing the effectiveness of FFSs and economic and social benefits to resource-poor farmers, have taken steps to institutionalise the IPM-FFS model for cotton and other crops in their mainstream extension.

A recent development in SE Asia has been the adaptation of the FFS approach for recovering biodiversity knowledge (PEDIGREA, 2003-7; Meijerink et al., 200X).

Diversification of the FFS approach at the institutional level has occurred with the livestock and seed FFS programmes with DANIDA support in Vietnam (ASPS, 2000-2005; Dalsgaard et al., 2005).

Sub-Saharan Africa

After a brief introduction in Sudan in 1993 and Kenya in 1995, a larger-scale launch of the approach in Africa actually started in Zimbabwe in 1997. FFSs are presently being conducted by a wide range of institutions in Africa, including FAO, DANIDA, many national governments, and numerous non-governmental organizations (NGOs). Unique challenges have arisen while attempting to apply in Africa this approach first developed in Asia. At its introduction in Africa, and at the prompting of farmers and facilitators during the first FFSs experiences in Zimbabwe, the focus of FFSs was on production and pest management (IPPM) because of the relatively low levels of production and pesticide usage. Cotton, vegetables and tobacco are the largest recipients of pesticide treatments. For example, in cotton IPPM, most farmers conclude that they are over-using pesticides and under-using quality seed, irrigation and fertilisers. In rice IPPM as well, farmers learn to improve yields without increasing use of (or beginning to use) costly pesticides.

In Africa the problem of pesticide use was less apparent and as a result several innovations have taken place since FFSs were introduced from Asia. First is the inclusion of more health and nutrition "special topics" due to the low level of awareness by farmers about the dynamics of diseases such as HIV/AIDS and malaria that are crippling many rural communities. Basic nutrition, water boiling, intestinal parasites and women's reproductive health are included in FFSs by non-IPPM extension officers or NGO guest facilitators. Perhaps the most exciting innovation, developed by womens' groups in Western Kenya, are "commercial plots" which are group production plots adjacent to the FFS learning plots. Such commercial plots allow the groups to raise funds and become self-financing in their activities. Efforts are underway to institutionalise these commercial plots in the FFSs so that they will be largely self-financed from the outset of programs. The International Fund for Agricultural Development (IFAD) is funding a four-country effort to develop the methodology by working with these innovative FFS groups.

As a result of the interest shown by farmers in health and nutrition, FAO, Wageningen University and Research Centre (WUR) and other institutions are in the process of adapting the approach to work with vector-borne diseases (van den Berg and Knols, 2006) such as malaria and bilharzia, particularly in West Africa. The gender and development service of FAO has put a large effort in adapting the approach in the area of health, particularly on HIV/AIDS and, also working with young orphans. These so-called Farmer Life Schools (FLS) and Junior Farmer Field and Life Schools (JFFLS) have built on the experience in Cambodia (Yech, 2003) and pilots started in a number of countries in East and southern Africa; now a programme runs in nine countries.

Table 4. Summary data of FFS implementation in SSA for the period 1993-2005 (Source: Braun et al., 2005)

Country	Start Year	Facilitators/ Trainers	Farmers trained	FFS
Angola	2005	$$$	$$$	$$$
Benin	2001	125	~1500	80
Burkina Faso	2001	> 217	> 6,253	360
Cameroon	2003	58	nda	64
DR Congo	2002	848	11,281	357
Ethiopia	1999	> 500	> 2210	~571
Gambia	2004	nda	nda	nda
Ghana	1996	nda	nda	nda
Ivory Coast	nda	41	nda	126
Kenya	1996	~1,660	nda	~2300
Madagascar	nda	nda	nda	nda
Malawi	2001	32	nda	>77
Mali	1997	>179	>7,693	>430
Mozambique	2001	>158	~1,605	243
Namibia	2004	40	240	8
Niger	2001	~50	~500	25
Nigeria	2001	>90	>1,000	>57
Rwanda	2005	$$$	$$$	$$$
Senegal	2000	>277	>6,468	>370
Sierra Leone	2003	260	18,400	736
South Africa	nda	nda	Nda	nda
Sudan	1993	1,626	4,197	>812
Tanzania	1997	>456	>10,000	>560
Togo	2004	30	307	12
Uganda	1999	>290	nda	>500
Zambia	1999	~382	~1,900	~140
Zimbabwe	1997	166	>3,500	>480

ILRI started adapting the FFS approach in Kenya in 2001 for similarly complex situations like animal health and production (Minjauw et al., 2002). As a result of the demand for livestock activities, ILRI has provided training and capacity building support in various other countries, such as Tanzania, Uganda, Pakistan, Costa Rica and others. Despite this success ILRI terminated FFS activities in 2006; activities in 2008 seem to be starting-up again with funding from the Bill and Melissa Gates Foundation.

The water and soil services of FAO, in collaboration with ICRISAT and national extension, have been especially active in Eastern and Southern Africa developing FFSs for soil husbandry, minimum tillage conservation agriculture, soil conservation, water harvesting and water moisture management in rain-fed systems (Hughes and Venema, 2005; FAO/IIRR, 2008), and a project in Kenya has also start to tackle land degradation.

In West Africa FFS developments have largely remained in deepening IPPM and diversification to other crops (cowpea by IITA; cocoa by IITA). After the introduction in West Africa in Ghana in 1996 a steady increase in the number of West African countries has occurred since, mainly thanks to a number of regional programmes.

Also in Africa, FFSs are becoming the foundation of field-based food security programmes , specifically in Kenya, Sierra Leone and Nigeria. Under IPM, farmers learn to better manage their crop for efficient use of resources (time, inputs, etc.). After the FFS, which is typically one to two seasons, farmers graduate with new skills. In fact, many groups of farmers in FFSs decide to continue their group as some type of informal or formal association as they have built trust and confidence together, which is a natural occurrence not unlike the emergence of alumni associations or the continuity of Lions or Rotary Clubs. A new trend that has emerged are marketing networks in FFSs that cooperate as a larger (business) unit (Khisa and

Heinemann, 2005). FFS networks in Western Kenya and Uganda consist of about 3,000 – 5,000 farmers per district and have obtained contracts with companies for bulk deliveries. The skills required for shipping the right quality and quantity at the right time are new to these farmer-owned networks and therefore the FFS curriculum is moving towards management topics as well.

A critical role of FFSs is the ability to up-scale by spreading out. A programme for 250,000 farmers over 5 years is being implemented in Sierra Leone, another for over a million farmers in Kenya and larger programmes in Tanzania and Nigeria. Up-scaling is possible because farmers can lead the largely hands-on activities of a well-designed FFS. In these programmes, the FFS complements other methodologies including farmer-to-farmer methods that have been found to be best for straightforward see-and-do methods such as water harvesting and storage. FFSs also complement methods for Particiaptory Technology Development (PTD) in production systems where new solutions emerge from collaboration between farmers and researcher experts – for instance, the successful Agricultural Technology and Information Response Initiative (ATIRI) activities by the Kenya Agricultural Research Institute (KARI) are a model system. Radio and other mass media play a role for motivation and information exchange especially where farmer interviews are used.

South America and the Caribbean

"Modernization" policies and structural adjustments throughout Latin America have dismembered classical agricultural extension and research services. This is transforming the roles of researchers and extensionists and placing greater responsibility on rural communities. While tremendously challenging for today's professionals and their institutions, improving present-day agricultural research and development has demanded approaches that are more responsive and better suited to local agro-ecological and socio-economic conditions. The efforts to introduce FFSs have led involved institutions to re-think how to organise themselves for greater and more effective agricultural innovation.

Responding to public sector collapse through collaboration

The International Potato Center (CIP), FAO, and a diverse group of governmental and non-governmental organizations have been working with Andean communities in Ecuador, Peru and Bolivia to respond to pressing potato-farming demands. Partners are striving to enhance farmer understanding of agro-ecosystems and to strengthen local decision-making and technology development capacities for a more productive and sustainable agriculture. Faced with tremendous pest problems and pesticide abuse, they have emphasised management-intensive approaches that require strong understanding of biology and ecology.

Beginning in the early 1990s, national and regional research institutes began to work more closely with communities to strengthen potato IPM. Presently, they are building on this experience through a range of participatory extension and research models, in particular the FFS methodology, Local Agricultural Research Committees (CIALs) developed by CIAT, and Farmer-to-Farmer extension developed by World Neighbours and others in Central America.

Researchers engage with communities in collaboration with NGOs and municipal governments. Such collaborative arrangements can yield diverse benefits. For example, communities gain new access to information and institutional resources, rural development agencies gain increased technical support, and research organizations gain brokers to mediate between their relatively narrow interests and the broader needs of communities.

Strengthening research and community-based agricultural development through FFS

In 1997, CIP and its institutional partners in Bolivia and Peru started to experiment with more participatory approaches to training (Torrez et al., 1999a and 1999b), incorporating some

elements of the FFS approach, but not the Agro-ecosystem Analysis (AESA)[3], which many consider to be its distinguishing feature. CIP has promoted the FFS approach through a project financed by IFAD in six different countries, including Bolivia and Peru. In each country a national research institute and an NGO, or other extension organization, has been included. In 1999, to support this project, the Global IPM Facility organised a course of three months to train FFS facilitators in Ecuador, Bolivia and Peru. These facilitators then returned to their work places and implemented the Farmer Field Schools, incorporating other important elements of the Asian model, such as the AESA. Although many of the fundamental principles have been the same, each country has had its own strategy of implementation, depending on the demands of the farmers and the unique institutional and organizational setting of each context.

In Bolivia, the PROINPA Foundation and the NGO ASAR have taken the lead in the design of the training curriculum. Both institutions, in close coordination, have promoted FFSs in different communities. In Peru, the NGO CARE has been responsible for the first implementation of the FFS. In Ecuador, CIP and INIAP, the national agricultural research institute, have promoted the FFS approach in the most important potato producing provinces through a network of local institutions. More recently, FAO established a national FFS programme in Peru that has effectively scaled-up IPM throughout the country. FFSs have also spread to Colombia, with the leadership of CORPOICA and FEDEPAPA, and to Central America (El Salvador, Guatemala, Honduras and Nicaragua) and Mexico, with the leadership of Zamorano/PROMIPAC and World Neighbours, and the Rockefeller Foundation, respectively. FAO has introduced the approach in Brazil and CABI has introduced FFSs to six Caribbean countries (Dominica, Dominican Republic, Haiti, Jamaica, Suriname and Trinidad and Tobago); this probably resulted in more interest in the approach in Suriname, which now has a joint FFS project with Guyana on rice and aquaculture. Eleven years after its introduction, the FFS approach has become well established throughout Latin America (Table 5).

Similar to the African experience, the practice of FFSs in Latin America brought a number of innovations to the methodology as a result of lessons learned in Asia and the unique farming systems and ecologies, institutions, and politics of the region. Introducing FFSs to Latin America required more than just a re-writing of extension manuals. Partner organizations were generally hesitant to blindly accept external ideas, but they were willing to explore common principles among successful IPM work and to adapt local methods. For example, after agreeing on the benefits of "discovery learning", local extensionists took to heart the re-design of their activities to create a new extension guide (see Pumisacho and Sherwood, 2000). The result was both a rectification of and improvement on existing experience in the region.

Presently, the chief challenge is political and institutional in nature. Impact studies conducted by CIP, INIAP, and the FAO have shown important contributions to farmer knowledge and a relationship between knowledge and increased productivity (van den Berg, 2004). Other studies in market and input intensive areas have shown that FFSs has enabled farmers to significantly decrease dependence on pesticides without negatively harming production per area and in

Table 5. Summary data of FFS implementation in Latin America and the Caribbean for the period 1997-2005 (Source: Braun et al., 2005)

Country	Start Year	Facilitators/ Trainers	Farmers trained	FFS
Bolivia	1999	175	~5,000	~100
Brazil	1999	160	~1,614	89
Colombia	2000	20	nda	>25
Dominica	2002	12	67	6
Dominican Republic	2002	8	10	1
Ecuador	1999	nda	nda	nda
El Salvador	2000	127	2,387	127
Guatemala	2004	53	136	29
Guyana	2003	>12	nda	6
Haiti	2002	24	55	2
Honduras	2000	nda	nda	nda
Jamaica	2003	12	25	1
Mexico	2001	>70	>2,500	>250
Nicaragua	2000	136	2,390	108
Peru	1997	nda	nda	nda
Suriname	2002	>13	>5	>1
Trinidad and Tobago	2002	16	19	2

[3] AESA is the process during which participants of the FFS observe and analyze the field situation, based on which they make the proper management decisions.

many cases improving overall productivity (Barrera et al., 2001). Despite such positive results, without public investment in agriculture, it has been difficult for FFSs to reach more than a small proportion of farmers.

Consequently, the present challenge for the diverse FFS movements in Latin America is to establish collaborative structures and finance and technical support mechanisms to sustain an FFS movement. The diversity of experience has brought a number of opportunities for the future. For example, in Central America PROMIPAC has tested an IPM labelling system to certify the clean production emerging from FFSs and to link groups to higher value urban markets. Similarly, groups in Ecuador have established production contracts with the agrifood industry, such as FritoLay and Kentucky Fried Chicken, which provide fairer prices and help farmers to avoid the variability of national markets. More work is needed to further develop such market opportunities for FFSs and to coordinate production among groups in order to meet volume demands throughout the year.

Rather than rely on NGOs and professional extensionists that are highly reliant on external funding sources, programmes are beginning to work more directly through community-based organizations and are training and supporting local farmers as FFS facilitators. This has led to the exploration of self-financing mechanisms, where the production of the FFS covers the costs of facilitation. In Ecuador, this modality start to dominate the FFS movement, with the FAO and local governments contributing financial resources to support a small team of technicians and researchers that provides informational and continued training support to farmer facilitators.

Table 6. Summary data of FFS implementation in the Near East and North Africa for the period 1996-2005 (Source: Braun et al., 2005)

Country	Start Year	Facilitators/ Trainers	Farmers trained	FFS
Algeria	2004	25	74	4
Egypt	1996	>950	>2,210	~571
Iran	2003	>49	nda	>42
Jordan	2004	8	nda	7
Kyrgyzstan	2003	nda	nda	19
Lebanon	2004	6	nda	6
Morocco	2001	>130	nda	~270
Palestine Authority	2004	6	nda	11
Syria	2003	>6	nda	>18
Tunisia	2004	23	44	3
Turkey	2003	nda	nda	nda
Uzbekistan	2004	12	240	12

Near East and North Africa

In the Near East and North Africa FFSs were first introduced in Egypt in 1996. Although these projects used FFS concepts as originally developed in Asia, several modifications were made. For example, efforts to implement FFSs in Egypt have found that group dynamics activities developed in Asia do not work in the Arabic-Egyptian culture (van de Pol, 2003). Reorienting FFS facilitators from a top-down technology transfer approach to a participatory approach has been especially challenging in Egypt, and has required intensive training in the latter over a prolonged period. Overall,

Table 7. Summary data of FFS implementation in Central and Eastern Europe for the period 2003-2005 (Source: Braun et al., 2005)

Country	Start Year	Facilitators/ Trainers	Farmers trained	FFS
Armenia	2004	13	110	14
Bosnia-Herzegovina	2003	23	260	24
Bulgaria	2003	9	110	10
Croatia	2003	11	170	14
Hungary	2003	15	210	21
Romania	2003	13	130	13
Serbia and Montenegro	2003	25	385	37
Slovak Republic	2003	5	40	6

adapting the FFS process to local circumstances must be a collaborative activity among farmers, facilitators and project staff (van de Pol, 2003). Other countries in the region did not follow the Egyptians in introducing the approach until 2003-2005. However, the approach is now established on a small scale in Algeria, Iran, Jordan, Kyrgyzstan, Lebanon, Morocco, Palestinian Teriitory, Syria, Tunisia, Turkey and Uzbekistan, involving five major projects, four of which are on IPM and one on management of salt-affected and gypsiferous irrigated lands (Uzbekistan).

Central and Eastern Europe

In Central and Eastern Europe (CEE) the FFS approach was first introduced in seven countries in 2003 through an FAO project with the aim of exploring and supporting farmers' roles in managing an introduced pest on maize, the Western Corn Rootworm, by means of IPM, and the longer term contribution of FFSs in strengthening farmers' farm enterpise management and agro-ecosystem innovation in CEE contexts (Jiggins et al., 2005). An innovative feature of this experience has been the development of *risk mapping* as a tool for farm- and community-based risk management.

Two other projects have also introduced the approach in Armenia; one on rodent control through FAO funding and the other with support from USDA has triggered the emergence of an NGO that now coordinates a number of FFS projects in the country.

2. Global Assessment of Farmer Field Schools

This section describes the main achievements and impacts of FFS, main strengths and weaknesses, constraints and the relationship between FFS supporting organisations and farmers' organisations

Main achievements and impacts

Adult education concepts and principles that underlie the design of curricula and the learning process have proven robust in all areas where FFSs have been developed and applied (Braun et al., 2005). Convincing evidence exists in terms of impact related to pesticide reduction, increases in productivity, knowledge gain among farmers (Rola et al., 2002; Praneetvatakul & Waibel, 2003) and empowerment (Züger Cáceres, 2004). However, some studies have indicated that FFS have limited or no effect on economic performance, the environment and health and farmer-to-farmer dissemination of information and technologies. Many development actors have also questioned the sustainability of FFS. A problem is that most studies are very limited in scope and carried out within project contexts, thus with a bias in terms of what is being studied and there is insufficient long time series data to assess longer-term impact. No agreement as yet exists as to what to measure, how to measure it, or how to assess the results of the measurement of impacts. The lack of consensus arises in part because of disputes over whether to classify FFS as an educational investment or as an extension activity, and whether important impacts are those relating to technological change or social/human capacity (Braun et al., 2005).

No thorough effort has been made to measure environmental impact of FFS programmes. In Asia the pesticide risk indicator model EIQ (Environmental Impact Quotient) has been used to assist in the assessment of environmental impact of Farmer Field Schools in comparison with conventional and organic crop management. However, empirical work on the impact of Farmer Field Schools on the environment in general is lacking (Braun et al., 2005).

The diffusion effect of FFSs is largely debated with several studies showing little diffusion of knowledge from FFS to non-FFS participants (Rola et al., 2002). However, practitioners argue that the reason for little diffusion lies in the nature of FFS where learning is about developing problem solving and innovation skills, thus not about simple technological messages that can easily be passed on to others. In fact the information obtained from FFS education is often not

Box 1.
In Mwingi district in Kenya a local stockist selling agro-inputs explained that farmers often blankly used to come and ask him to tell them which seed to buy without ever questioning his advice. However among FFS graduates he had noticed a fundamental change in that they often confidently would come and ask for a specific variety, and when the stockist would enquiry why the farmers were able to specify reasons in detail, referring to reflections upon actual field experience for why demanded the particular item. This indicates an increase in self confidence and changes in how farmers perceive their role vs. the role of expert outsiders (Duveskog and Friis-Hansen, 2008).

expected to diffuse but to generate social and economic multiplier effects that deliver positive public and private benefits. Preliminary data suggest that information, and simple practices that can be observed by non-participating farmers, do diffuse from FFS participants, to some extent, but not the self-confident knowledge and skills in problem-solving required for the kinds of purposes for which FFSs seem best suited (Braun et al., 2005).

Empowerment outcomes reported from FFS include changes in perspectives with boosted self-confidence and pride, as well social change and action being triggered following participation in FFS. Farmers have gained agency in terms of taking a greater control over their lives.

Much of the social change experienced among FFS graduates relates to farmers taking steps for dealing with challenges and obstacles faced through reflective critical thinking or collective action. This often results in farmers that increasingly are challenging authorities, information providers or market actors. Although FFS are time-bound, many groups formalise their relations and continue studying together or developing action projects, including FFS on other subjects, after the initial FFS has finished.

Within the Indonesia community IPM program six cases reported compelling descriptions of change in graduated farmers in terms of increased self-regard, increased control over their assets, social skills, and their interaction with other farmers, service providers and local government. The studies explained how these changes resulted in non-project activities (i.e. activities without external funding or organisation), new structures and networks, and policy change (FAO, 1998).

FFS are considered "stepping stones" to move to networks, federations and associations. In most locations with relatively large scale FFS interventions farmer networks and associations have emerged as a follow-up effect of FFS and these units have increasingly been breaking manipulative relationships with trade middlemen and thereby gained access to more lucrative markets for sale of their produce. This is a large breakthrough considering that normal practice often entails farmers being manipulated and exploited by market actors. Farmers attribute this achievement to the social bonding and trust building taking place within the FFS context. The chances of such innovations occurring appear to be strengthened if care is given in the implementation phase to the longer term prospects (e.g. in the processes and criteria used for participant selection and site selection), follow up support is given to farmer facilitators and FFS alumni, and farmer-driven network development is encouraged.

Follow-up effects of the IFAD-supported FFS programme in East Africa include strong formalised farmer networks organised at various levels. These networks have increasingly taken on marketing and input supply services on behalf of its members. For example the Kakamega FFS network has established a district office, which buys inputs (seeds and fertilisers) in bulk and resells them to members in packs of smaller quantities, sometimes also dispersed on a credit arrangement. This has greatly assisted farmers in accessing inputs for their farm activities and helped in boosting production (Okoth et. al. 2006).

Following the farmer networking and capacity for collective actions FFS members have in many instances gained access to governance and policy processes. The Community IPM programme in Asia (Pontius et. al., 2002) reported farmers extending activities such as local bulletins, people's theatre, field days and seminars from the neighborhood to the national arena. In Indonesia the FFS IPM Farmers' Association founded their own newspaper with an initial print run of 10,000 copies and in several countries in Asia, field school methods found their way into primary, secondary and even college curricula; revamping teaching-learning processes.

In Uganda, Soroti district is often taken as an example of the success of the innovative national extension programme NAADS where farmes' fora have been strong and effective in demanding and organizing demand-driven privatized extension services. Current research show strong links between the success of the programme and the presence of FFS alumni in the district as a large majority of farmers involved in decision making processes proved to be ex-FFS members with strong negotiation and leadership skills (Friis-Hansen et.al., 2004). The study further shows that FFS participation has to a high extent facilitated the access to services from the local government and private sector. Despite the success in Soroti District, NAADS has not expanded FFS to other districts in a similar mode. There may be a change to this in the near future given that President Museveni has directed FFS to be used countrywide following a successful FFS programme on Banana Bacterial Wilt management in various districts.

Strengths and weaknesses of the FFS approach

Strengths

Conventional extension often fails due to incorrect recommendations being provided to farmers, causing a lack of trust between farmers and the extension worker. Rural extension staff are generally not capable of dealing with the full spectrum of complex problems that farmers experience. Most sustainable agricultural practices are knowledge intensive (as compared to input intensive agriculture) and as such very few blanket recommendations exist and practices (especially among smallholders) need to be developed or adapted locally. Hands-on education is needed especially in order to improve farmer expertise in the management of site-specific agro-ecosystems – for which there appears to be no shortcut alternative (Schmidt et al., 1997). Here FFS play an important role since the approach does not rely on highly trained external advisors but on farmers own discovery and reflection.

In the changing context for rural smallholders where no blanket recommendations exist in agriculture and collective action is required to access markets, farmers need to organize, be innovative and be able to adjust to changing situations. In this context FFS has an important role to fill to in the development of locally based innovations, create knowledge for a framework of action and boost local management and leadership skills, aspects not normally catered for in regular training and extension based on technology transfer concepts. Human empowerment is often assumed as a precondition for the success of community-based interventions, services and project. However, often such interventions fail since the level of empowerment generally is low, particularly in Africa. Thereby FFS play an important role in serving as a platform for human capacity building and empowerment, which in turn can ensure the success of services provided for the community (Duveskog and Friis-Hansen, 2008).

FFS is best suited for problems and opportunities requiring site-specific decisions or management practices and for issues that entail articulation of changes in behaviour within the farm enterprise, household, and community or among institutions at varying scales of interaction and situations that can be improved only through development of location-dependent knowledge (Braun et al., 2005). Their comparative advantage relies on skilful incorporation of the following principles: (i) learner-cantered, field based, experiential learning; (ii) observation, analysis, assessment, and experimentation over a time period sufficient to understand the dynamics of key (agro-ecological, socio-ecological) relationships; (iii) peer-reviewed individual and joint decision making based on learning outcomes; and (vi) individual and group capacity building (Braun et al., 2005).

The FFS process builds self-confidence (particularly for women), encourages group control of the process, and builds group and management skills. Thereby the FFS is a means to enable vulnerable farmers to create their own cohesive economic empowerment groups that are capable to venture into collective, commercially-oriented endeavors and ability to interact with service providers and market intermediaries. A major strength of the FFS is that it helps in strengthening civil society or social capital at village level. This happens when FFS mobilises interest in a community, especially among those who do not belong to the "official" class of the community. Farmers gain voice and are taken more seriously as part of the decision making process.

Related to the issue of lack of formal extension staff in many countries, particularly in drylands and pastoral areas, FFS provides an advantage in that it provides an opportunity for farmer-to-farmer extension. Farmer-led FFS have been a common strategy both for scaling-up up FFS interventions and for cost reduction in both Asia and Africa. FFS graduates are selected and appointed as FFS farmer facilitators that carry on the knowledge gained as participant in FFS as farmer facilitator for new FFS groups in the community. It is thus possible to scale up interventions even when there are very few extension staff. Since solutions are obtained jointly and through an experimentation process the FFS can function

well even with facilitators of relatively low technical skills. This is a big advantage in the current situation of low investment in pubic extension systems and lack of extension staffing.

Due to the informal and participatory nature of FFS, with its inbuilt group dynamic and team building exercises, it provides an ideal entry point to deal also with broader livelihood issues such as nutrition, health and sanitation. In particular sensitive aspects such as HIV/AIDS, violence, family planning and human traumas can often be effectively dealt with in FFS following the breakdown of barriers between men-women and rich-poor that the FFS situation stimulates.

The FFS approach can further act as a bridge between emergency and development by forming a platform for immediate input supply, agricultural training as well as building organizational capacities for future longer-term interventions. Whereas inputs and emergency support are important among communities suffering from civil strife or returnees' efforts are also needed in terms of knowledge for efficient utilization of the inputs, food & income security and psycho-socio rehabilitation, something the FFS approach can fill.

FFS provides a set of rules and processes that are fairly easily understood by most extension and community development facilitators. This helps in-experienced facilitators or staff that may have a somewhat top-down attitude to still implement extension in a participatory manner. Even though FFS also depends on personal skills, the quality of participatory extension practice of more flexible nature (Hagman and Chuma, 1999) without the "package"-like structure of FFS is usually much more vulnerable to constraints in personal skills and attitude among the extension facilitators. The "package"-like concept of FFS also makes it easier to scale up FFS in national extension systems, and has largely facilitated the institutionalisation of FFS in many countries such as Indonesia and Tanzania.

Weaknesses

FFSs are not a universal panacea for development, nor are they a substitute for more familiar technology-centred, or profit-driven approaches to rural development, such as extension, credit cooperatives, core-estates with out-growers, farmer training centres, or the use of mass media (Braun et al., 2005). The FFS supports an educational approach that emphasizes experiential learning, action research and critical thinking, to enable farmers to take the lead in local adaptation of practices. Clearly, the FFS is not the best instrument for achieving quick and wide application of standardized recommendations. There are instances in which "technology transfer" is useful and for such issues, non-FFS methods, such as radio and community meetings are often more appropriate. Extension campaigns and the FFS were thus implemented side by side and could be considered complementary.

Often FFS is specified as costly, particularly under the current situation of structural adjustment and declining agricultural (national) budgets. Efforts have been made to compare FFS costs vs. other methods of extension but the comparisons falling short due to the difficulties in comparing outcomes of the investments, particularly in relation to aspects of empowerment, which are very difficult to cost. The debate shifts when FFS are regarded as a form of public investment in farmer education to tackle rural poverty – and hence as a tool for achieving the Millennium Development Goals – from issues of diffusion and absolute costs, to issues of quality and comparative effectiveness of different forms of rural adult education. The cost issue is currently being addressed in on-going FFS programmes, especially in Africa, where various models of revolving FFS funds, self-financing and FFS loan and repayment schemes have been explored. The use of farmer facilitators also provides drastic reductions in costs.

FFS are vulnerable to loss of quality (and thus impact) particularly in terms of poor or inappropriate curriculum design and inadequate attention to the quality of the learning process. With the current popularity of the approach practitioners and policymakers sometimes "pick and choose" sub-aspects of the approach, not paying attention to the necessary adult education and experiential learning principles woven into FFS. Field experiences show that the approach often loses its effectiveness when the fundamental

principles and components are overlooked and that FFS needs to be implemented as a complete package to achieve desired results. An aspect that often is overlooked is the need to train FFS facilitators thoroughly (season-long) in facilitation skills. Often priority is given to technical training of facilitators rather than provide opportunities for personal development and mentality change among facilitators – which requires time to enable staff to make the shift in thinking feasible. Further, to implement FFS well it is imperative that the management and supervisory levels have a participatory mindset and are well versed with the approach, something often lacking in FFS development projects.

Despite FFS attracting mostly women farmers, there are concerns that vulnerable individuals may find it hard to participate in the relatively intensive FFS learning processes. Due to poverty, short-term needs is a priority for many poor families, particularly single parent headed households, and many poor need to spend considerable time in search for casual work. Participation of the most vulnerable though is a general problem in development work and being addressed where available through "food for training" arrangements, which allow the poorest to join in development activities including FFS.

Constraints faced by FFS in various contexts

A big constraint for FFS is variation in quality among extension staff. Most existing extension staff in developing countries were hired and trained under the Training & Visit era, where extension was considered a process of technology transfer from the expert to the farmer, with very little room for joint reflection. After many years of involvement in this rather top-down type of extension practice a large amount of re-training is required among staff to allow for a mentality change towards client service orientation and appreciation for local and indigenous knowledge. Variation in quality of extension staff, just as in any teaching environment, results in variations of FFS quality.

Well-trained farmers are often better facilitators as they are more practical, have the respect of the community and know local conditions better. However, often national Governments prefer using mainly public extension staffs as FFS facilitators. In some cases public staff may not be suitable for FFS work. For example in Ethiopia public extension staff also serve the function of collecting taxes among farmers. This provides great challenges in ensuring transparency and trust between the FFS facilitator and farmers, an important ingredient for successful FFS development.

In the IPM programme in Indonesia post-FFS activities, supported by external funding, were considered crucial for the emergence of farmer-driven programs and village associations (Pontius et al., 2002). Through post-FFS educational opportunities farmers learned to create knowledge, plan actions to solve livelihood problems, and share their knowledge and plans with other farmers and government officials in village-level workshops and sub-district forums. Moreover, farmers learned how to conduct FFS by themselves, and joined farmer facilitator networks. Similarly in Kenya, post-FFS support in terms of access to credit or revolving loans, training in management and organisational skills, and farmer cross visits and experience sharing events proved crucial in catalysing a development of local farmer organisations. Despite experience showing the importance of post-FFS support few, both donor and government, programmes provide adequate post-FFS graduation support, or merge their FFS support with efforts to establish an enabling environment for the emerging business entrepreneurs coming out of the FFS learning process.

Post-war situations in many countries, particularly in Africa, present FFS with a certain set of challenges. In these contexts there is a great sense of urgency in meeting expectations in the shortest time possible. The history of emergency support through input distribution and food for work support have created a situation where community members are accustomed to immediate benefits, handouts and even expect incentives to attend meetings or be part of project activities. FFS emergency programmes - given the FFS nature with its long-term focus, both physically and mentally challenging - often find it difficult to gain immediate popularity

among communities and extension staff, and find themselves in conflicting positions towards other programmes supporting a more "hands-out" based approach.

The boost in production experienced by FFS members does not always provide immediate benefits due to challenges in marketing. Often the poor road and transport network in rural areas makes it difficult for farmers to move their produce to market places. Poor communication channels make it difficult to access market information and thereby make farmers vulnerable to exploitation by middlemen. Monopoly of markets spaces makes it virtually impossible for local farmers to enter their produce into public markets. Lack of organizational skills and established farmer organizations and cooperatives mean that the road to collective marketing of produce is long and that FFS interventions need to build strong organizational and management skills along with technical skills.

In some hierarchical cultures the informal nature of FFS provides some challenges where community members are not used to interact in an informal manner with external advisors nor work together across gender in groups. When introducing FFS in Egypt (van de Pol, 2003) it proved necessary to hold separate FFS meetings for men and women since women would not participate or speak in the presence of men. A similar situation has been recorded in some Arabic and Asian countries. In Ethiopia extension workers are used to act as the advisor in a highly formal and sometimes patronising manner and attempts to introduce the FFS approach have found great resistance among extension staff for group dynamic tools such as singing, dancing and in general to interact informally with farmers on an equal power base.

Relationships between organizations supported though FFS and existing organizations at various levels

At local level existing organisations such as Community Based Organisations (CBOs) and self-help groups often provide an entry point for FFS. Groups are already organised and can quickly benefit from the FFS activities. However, since FFS provide for rather intensive involvement there are often some members of existing groups that are not able or willing to engage in FFS and this can create conflicts in the group. For this reason many programmes prefer to facilitate the start-up of new groups for FFS rather than use existing groups. In new groups it can be assured that all members have a common understanding of the expectations of the group learning process.

In most contexts FFS graduates have shown a tendency to organise themselves in new structures such as networks, associations and marketing groups rather than integrate into already existing organisations. This has been the case both at local and national level. Reasons seem to be that FFS creates a togetherness and cohesion where farmers have a common reference point, the learning process undergone, and to a certain extent share a common culture through FFS processes with common slogans learned in FFS. Trust is also a major factor, particularly when engaging together for the sake of income generating activities such as collective marketing. In FFS farmers learn to manage funds, keep accounts and maintain transparency and this creates trust among each other and for the leadership. In many existing farmer organisations such as National Farmers Unions, it is relatively difficult for individual farmers at local level to exercise influence and poor management is often a common feature among these organisations. However, as the local FFS organisations grow in strength and gain visibility it becomes easier for linkages to be established with existing institutions. For example FFS alumni leaders are often elected for leadership positions in more formal organisations. This was the case for example in Gerung in Indonesia where IPM trainers were frequently elected for leadership positions in the local farmer groups and water use associations and as a result IPM strategies became mainstreamed in these existing forums. Another example where FFS has integrated well with local structures is the national extension programme in Uganda (NAADS) where the District Farmer Fora are the main decision making body at local level. In districts where FFS was already well established when NAADS started FFS graduates and their strong farmer groups took up much of the leadership of the

Farmer Fora which provided an excellent institutional framework for pursuing agricultural development and poverty reduction.

This pathway to influence observed among FFS graduates is in line with theoretical concepts of institutionalisation. Upphoff (1999) holds that membership organisations are effectively institutionalised through a process that begins with self-help projects aimed at solving local problems. Mobilisation of resources is then carried out on behalf of these projects and acknowledgement is built that those projects are contributing to the efficiency and effectiveness of local development by local institutions.

3. Case Studies

$$$ Intro to Case Studies

3.1 Farmer Field School Networks (Region: Sub Saharan Africa)

Introduction

Farmer Field School Networks started emerging in East Africa in the year of 2000 as an un-anticipated follow-up effect of the IFAD funded and FAO implemented East African Integrated Pest and Production Management Farmer Field school programme. In particular the FFS networks took off as a result as a result of farmers wanting to continue with the dynamics and positive attributes generated by the Phase I IFAD/FAO project. Key question here was what will happen in the event that there is no external funding. The farmers were actually looking beyond the life of the project. By that time nobody had thought about a Phase II. A two year interruption between phase 1 and II helped to cement this thinking.

What is a network?

FFS Networks consist of informal or formal groupings of FFS groups with a common interest that draws its membership from all the FFSs within a given geographical boundary, such as a division or district. Each FFS elects one representative to the higher network level. These representatives then elect the next network level representatives. These Networks offer a number of services to its FFS member groups and individual farmers. The networks are characterized as FFSs clustered in a registered or non-registered association or not-for-profit company. The Network usually have an elected core executive board and at least three working committees such as finance and planning, the loans committee, the market information service committee etc. They have a constitution, bye laws, are registered and have a bank account. The operations are supported financially by the members FFS through subscription fees, commission on bulk sales, shares, profit from sale of farm inputs etc. To date, the FFS Networks in Eastern Africa support about 2,000 FFSs with close to 50,000 direct beneficiaries.

Evolution into networks

As the number of FFS groups in the program grew and broadened in their level of operation, new challenges and issues emerged that could not be solved effectively by individual FFS group. Also there were increased opportunities for the FFS to take advantage of and enjoy economies of scale necessitating more interaction and coordination among themselves. Based on this and following a number of exchange visits and interactions between farmers, facilitators, trainers and project staff in western Kenya in early 2000, FFS Networks at various levels started to emerge.

The FFS networks were mainly formed by farmers who had graduated from FFS training and another reasons for their formation was that the graduates wanted to continue the dynamics generated by the FFS process: to build local institutions to ensure the continuation of farmer led FFS, and gaining a stronger voice in expressing their demand and so on.

The inherent attributes of the FFS approach of cultivating cohesion and a willingness among farmers to learn together while solving problems that affect them as a community, build their social capital as an individual amongst communities. As a precursor to transformation, the level of empowerment and organization developed in an FFS is critical and can have significant impact on the marginal returns of a subsistence-based farming system. This strong intra- and inter-group cohesion within and among FFS groups is one of the main contributing factors to the emergence of higher level associations like the FFS networks in the East African region.

Benefits to farmers

FFS network members state a range of benefits experienced from by the Networks among which increased voice and power and access to services and markets seems most important.

Despite the range of market barriers experienced by smallholders the networks have in many instances been able to arrange collective marketing and sale of products among their members, and thereby benefitted from economies of scale and gaining higher prices. The networks have assisted in identifying markets and collecting marketing information making it possible to plan for bulk sale among the members. A network based monitoring and record system has also assisted in keeping track of availability and quantity of produce among group members, thereby making it possible to negotiate with potential buyers in advance of actual harvests. By selling in larger quantities member FFS are able to reduce transaction costs, gain bargaining power and thus command better prices for their products. They have increasingly also been able to break or weaken manipulative relationships with trade middlemen and thereby gained access to more lucrative markets for sale of their produce. This is a large breakthrough considering that normal practice often entails farmers being manipulated and exploited by market actors.

To assist its member in access to affordable quality inputs such as seeds and fertilisers the networks have arranged bulk purchases of inputs for re-sell among members in smaller quantity packs, thus improving access and lowering costs. Many networks also operate a small input kiosk at their office location for sale of these inputs.

By joining together, farmers have also gained better access to technical and advisory services that would normally not be easily accessed by individual FFS groups or farmers. Government and other extension agents have been very responsive to request for assistance by the networks since they can reach more people through the networks than when working with individuals. The networking also acts as a safety net, sustain the FFS process long after the end of a given projects. Networks further assist in the access to financial services, both in terms of access to formal bank credit services and informal credit organised by the networks themselves. By jointly applying for/guaranteeing loans for individual members or groups and helping each others in the development of proposals it has proved easier to access formal bank credits. Further, a savings fund is in place in most networks from which individual FFS can borrow money through informal credit arrangements.

Farmers are further appreciating the sharing of information and experience that the networks facilitate. Through the connections with other networks member farmers are able to share both technical knowledge and new farming ideas as well as benefit from the social network that the networks provide in terms of mentoring, encouragement and a feeling of togetherness. Farmers attribute their motivation for involvement in network activities to the social bonding and trust building taking place within the FFS context.

Following the farmer networking and capacity for collective actions FFS members have in many instances gained access to governance and policy processes and FFS members have been invited to represent farmers in functions by the government and other service organisations.

Sustainability

Sustainability of Networks are ensured in a range of ways. Financially the operations of the FFS Networks are supported by the constituent FFSs through annual or monthly contributions in the form of subscription fees. Other sources of income include interest charged on the revolving funds, commissions on bulk network sales, registration fees, fines or penalties, donations and grants, shares from FFS members and profit from sale of farm inputs. Many networks operate a revolving loan system and therefore over time are able to generate more funds to cover operations and fund more activities. Politically and institutionally the networks can be considered independent of government and development support. The networks are fully locally grown, owned and managed. Donor support, where

involved, has assisted in provision of infrastructural support such as computers and in training on management relates aspects. However there is no case where donor support has been provided for the recurrent operations of the networks.

Environmental sustainability is supported by the application of environmentally sound farming techniques. FFS learning revolve around principles of integrated production and pest management where farmers try to balance the ecological aspects with the economic aspects in their farms or business.

Scaling-up

In most locations where a considerable numbers of FFSs have been implemented, independent of the kind of management or financing modalities, FFS networks have spontaneously emerged. Currently there are FFS Networks in place at different levels in many district of the East African countries and also other parts of the region. Most networks have emerged in relatively high potential (high rainfall) areas but there are also examples of Networks in semi-arid and arid lands. An enabling factor for replication has been the fact that FFS graduates want to continue the dynamics generated by the FFS process and the recognised need to build local institution to ensure the continuation of farmer led FFS, for which there is a high demand among communities. Through various modes of sharing of information networking is also promoted when farmers hear success stories from other places. In East Africa the virtual network "Linking Local Learners" that connect farmer groups and networks online for discussion and sharing have contributed much in the facilitation of growth and development among FFS networks.

The emergence and expansion of FFS Networks has also been attributed to the "foci model"[4] that was adopted for the establishment of the FFSs in East Africa. In this model successive FFSs are established in the immediate neighborhood of existing ones in order to form a cluster. This has enhanced the frequency of interaction, experience sharing and horizontal flow of information among the different groups. The model also reduces cost of implementation of collective activities because the different FFSs are able to procure inputs and market their produce in bulk.

Lessons learned

FFS are considered "stepping stones" to move to networks, federations and associations and is an effective platform for farmer organisation and empowerment where smallholder farmers with a common interest can gain increased access to markers. These networks serve an important role for farmers both in terms of social and technical support. The chances of network formation to take place can be strengthened if care is given in the implementation phase of projects to the longer term prospects (e.g. in the processes and criteria used for participant selection and site selection), follow up support is given to farmer facilitators and FFS alumni, and farmer-driven network development is encouraged.

In the case of the East African FFS networks it is clear that market information has been crucial for enhancing farmers' access to markets. However market information is not always easily accessed by rural, often illiterate, farmers. Extension advisors are often not comfortable or capable of changing their role from mainly providing technical messages to serve more of the role of an "information brooker". The lack of assistance to respond to farmers demands in terms of market facilitation provides a great challenge for FFS groups and networks in changing from subsistence farming to a more commercialised farming. There is thus a need to rethink the role of extension and (re-)train extension agents accordingly.

Based on needs realised and expressed by networks there is a demand for more attention to capacity building of the rural poor in the fields of financial management, marketing, standards and quality, and use of information and communication tools. Much of the current

[4] Growing from a nucleus outwards.

extension practice is targeted at improving technical skills only, and not addressing management skills.

As the FFS Networks grow and take on more complex initiatives, there is need for more investments in training and equipping the FFS networks with relevant information and communication technology to bridge the information gap and enhance the diversification of business opportunities and improve efficiency of operations. Computer access and usage skills and access to internet are of priority. Further, the revolving funds that have been operationalised within some of the FFS Networks need to be natured into a more sustainable and long-term investment venture by supporting the FFS Networks to identify viable income generating activities.

3.2 Junior Farmer Field and Life Schools (Region: Sub Saharan Africa)

The JFFLS approach

The JFFLS concept is an adaptation evolved out of the successful approaches of Farmer Field Schools (FFS) and Farmer Life Schools (FLS), initially developed by FAO, but later mainstreamed into many development programmes. With the growing numbers of orphans due to the HIV and AIDS epidemic and recognition that these orphans often are left particularly vulnerable the JFFLS evolved as a mean to address the particular needs of orphans and vulnerable children (OVCs). OVCs are often left with few skills for their future livelihoods because values, beliefs and agricultural knowledge are not passed on to them through their parents and they therefore require agricultural and livelihood skills, education and nutrition to grow into healthy adults.

The JFFLS was first introduced in 2003 in Mozambique where civil war, compounded by HIV and AIDS, had caused large number of orphans. Today JFFLS is implemented in Cameroon, Gaza and West Bank, Kenya, Malawi, Mozambique, Namibia, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe. The goal of the Junior Farmer Field and Life Schools is to increase short and long term food security and well-being of children in households made vulnerable by HIV and AIDS. Expected benefits among OVCs through the JFFLS include: (i) Increased knowledge on (gender-sensitive) agricultural and life skills; (ii) improved food security; and (iii) Increased capacity to avoid adapting HIV-risky survival strategies. By improving children's skills for livelihood support and food security participants can become a valuable resource rather than being burden to the society. In the community context the JFFLS aim to strengthen institutional capacity of communities and key partners to address gender and food security issues among OVCs and vulnerable households and establish and strengthen partnerships between key stakeholders (community, district, national and international levels) to empower and support OVCs.

In JFFLS, the children, mainly between 12-17 years old, attend a one-year programme, which follows a season cycle. Group meetings are held two to three times a week outside of formal school hours. The classroom is typically an open field, where the children learn about agriculture "by doing" i.e. preparing the soil, planting, nurturing and harvesting. The interdisciplinary team of JFFLS facilitators includes teachers, agricultural advisors and social animators. Often activities are carried out in connection with the provision of food aid, in order to also cater for the short-term nutritional status of the children. In addition to developing farming skills, broader life-skills such as HIV and AIDS awareness, child protection, psychosocial support, nutritional education and business skills are also covered. Participatory Educational Theatre is used to enhance trust, explore risks and solve problems and strengthen agricultural and life skills.

Access to services

The JFFLS provide vulnerable children an opportunity to access services not normally acquired. Generally agricultural extension and training activities do not include children since it is believed that parents will pass on the knowledge to their children. For orphans, the JFFLS thus play a crucial role in providing access and capacity to take advantage of advisory and training/information they otherwise are discriminated from. The JFFLS further ensures that children gain access to and control over natural resources such as water and forests, normally often limited for access by children and the income generation aspects of the JFFLS ensures that children are provided opportunities to take advantage of local output markets. Further, the JFFLS provides a voice for a normally silent target group, giving children opportunities and ability to voice their concerns and participate in informal decision making and governance processes locally and nationally.

Experiences from Mozambique

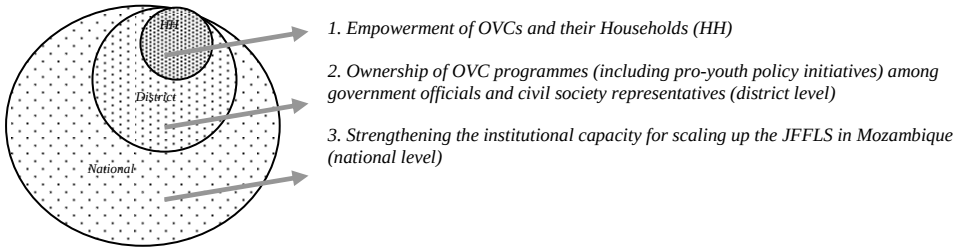
Expansion of the programme

In Mozambique the JFFLS expanded from a pilot project in 2003 working with 100 children in four Community Based Organisations (CBOs), to in 2007, a full-fledged and diversified programme benefiting 840 children per year (and indirectly their families, caretakers and communities) in 13 districts of Manica and Sofala provinces. Along the way, the JFFLS programme (known locally as "Celeiro da Vida" – Granaries for Life) underwent significant transformations, particularly in two areas:

- The JFFLS methodology was fine-tuned through a number of Training of Trainers (TOTs) where feedback from the field activities and the contribution of resource experts (local, regional and international) led to a set of context-specific learning materials and tools on agriculture and life skills designed for the needs of vulnerable youth, with a strong focus on gender and HIV & AIDS.
- The institutional framework of the programme was strengthened, in relationship to local stakeholders (CBOs, NGOs), to the government and to international partners. Communities and local stakeholders (particularly faith-based organizations (FBOs) and primary schools) were involved in the management of the programme, eventually leading to the local ownership of many JFFLS. In addition, governmental structures from the ministries of Agriculture and Education increasingly took over key roles in the management and conceptualization of the programme.

A major steppingstone towards the institutionalisation of the approach was the evaluation assessment carried out in 2005, by a multidisciplinary team including the Mozambican government. Although the assessment reported many shortcomings, the lack of training of the facilitators and an entrenched habit of top-down education in Mozambique – it also showed that it had an important impact both in terms of the empowerment of the beneficiaries and in terms of increased and sustainable food production. The assessment recommended a phase of consolidation, for fine-tuning of the approach and underscored the comparative advantage of working in the formal education system linked to local schools for sustainability of the programme. Further it recommended institutionalisation in Ministry of Education of inclusion of JFFLS methodology in teachers' collage training, strengthening the capacity of local hosts to "own" the project; improvement of the M&E system and more diversified learning materials.

Apart from improved food security and sustainable livelihoods of OVCs and their households the Mozambique programme aimed to reach a multiplier effect and to benefit directly and/or indirectly a range people or institutions. Local schools hosting JFFLS activities were expected to including JFFLS activities in the 20% of the school term devoted for the "local curriculum". In addition, teachers and extension workers at formal schools, and in local organisations and the local community members and JFFLS facilitators benefit from the training programmes offered to improve their management and facilitation skills as well as their general knowledge of agricultural and life skills. The impact was thus aimed at three levels:



Learning Content

A major impact of the activities in Mozambique was improved diet. The production of vegetables in the JFFLS learning fields improved the food diet of the children who sometimes were not accustomed to eating vitamin rich vegetables. For instance, a community around a JFFLS in Mozambique reported improved nutrition because of the introduction of new vegetables for home consumption (lettuce and green peppers).

In order to ensure sustainability the programme strategies were developed to assist JFFLS graduates to start small income generating activities. In 2006, a pilot project was initiated, involving four JFFLS, to provide them with the opportunity to run small businesses and thereby secure an income for themselves and their families. JFFLS facilitators where trained in business management, using appropriate methodologies for children and semi-illiterate people and thereafter children and their caretakers were; 1) sensitizised on the importance of creating self-employment and on the main challenges faced when managing a business; and 2) assisted in identifying micro-business opportunities, based on resources availability and market demands. The initiative showed that the involvements of household members in the trainings are very important for success of business ideas. Innovative micro-projects that emerged through the trainings included; production of fuel-saving stoves, construction of wells and nurseries, animal traction and transport services, rural input and supply shops.

JFFLS in Kenyan refugee camp setting

The refugee camp setting

In Kenya the JFFLS approach has been adapted for the refugee camp setting. In 2006 a pilot was started in Kakuma refugee camp in Northern Kenya, initiated by FAO and implemented on the ground by GTZ, in close collaboration with UNHCR and other local actors. The aim of the initiative was to explore how to tailor effective agricultural and life skills services suited to the needs of populations of humanitarian concern (PHC). In particular the pilot tried to address the prevailing situation of lack of capacity among actors to meet the needs of refugees, especially children, lack of the involvement of PHC in the design and delivery of services, lack of consideration of the diversity of PHC and contexts where they live or originate from and lack of accountability towards PHC among service providers.

Children in well-established refugee camps such as Kakuma have the possibility to go to school. However, additional educational support is often needed. Many children have experienced war, lost parents and relatives and have gone through difficult times before arriving at the camp. The camp provides safety but not a normal life. In order to be able to build a future life outside the camp the children need to learn both agricultural and life skills. Children and orphans of in refugee camps are particularly vulnerable due to conflicts in their home countries and threats of HIV and AIDS and therefore need skills that can assist them to cope with life. The programme thus aimed at equipping the OVCs with technical agricultural and life-coping skills for adoption both in the camp and for future applications back in their home countries. Of particular target were the OVCs of Sudanese origin due to the ongoing repatriation of Sudanese refugees from Kenya.

Implementation process

At the start of the Kakuma pilot 19 facilitators were trained through a 2-weeks TOT followed by JFFLS group formation. Among the local primary schools both inside and outside the camp 5 primary schools within the camp and 1 school in the host community were selected for hosting of JFFLS activities. A main consideration when choosing the schools was their access to a reliable water supply.

The JFFLS activities included 6-monhts training according to the JFFLS curriculum developed and some of the main impacts noted were;

- The participants were able to explain thoroughly the agricultural practices and the life skills learnt and they were able to lead sessions on the same and capable of teaching others.
- Parents/guardians and teachers confirmed a big positive change in their children and cited impacts such as increased discipline, interest in academics, assistance at home, personal hygiene and interest in farming.

Adapting the JFFLS approach to refugee camp settings required special attention to be paid to the aspect of planning in life. In Kakuma's pilot phase, children were facilitated to think and plan for their future upon return to their home country. What would they like to do and how did they think they would achieve those goals? For studying the agricultural topics, vegetables was selected in order to be able to draw linkages to the importance of balance nutrition in life. WFP food support in the camp seldom included vegetables in the diet so through the cultivation of vegetables during the JFFLS the children were thus able to supplement their diet with the needed vegetables and learn about the importance of including vegetables in their diet also in the future. Due to land limitations in the camp setting farming activities were limited to the use of kitchen gardens and multi-storey gardens, which proved adequate for learning purpose in the JFFLS.

A graduation ceremony among the 178 children and 13 facilitators was held in early 2007 during which, each of the JFFLS participants and their facilitators received a certificate. Some of the lessons of the pilot phase included that a JFFLS cycle in vegetable production needs to be of duration of about 6 months and pesticides should not be ruled out completely in control of crop pests and diseases, in order to ensure yields. It was noted that the host community require a slightly different learning curriculum than the camp participants due to the different contexts of the two groups. A parallel program for the parents to help understand the importance and value of JFFLS to the society would also highly facilitate the impact of JFFLS activities.

Lessons learned and policy conclusions

JFFLS has shown to be a flexible tool where new topics can be incorporate in the curriculum and adjustments can be made to meet the circumstances of each particular setting or target group. Learning agricultural and life a skill through participatory methodologies combined with creative and expressive activities is a very unique way of making skills stick into the minds of the junior farmers and provide immediate impact to the learner and the people around them. However, adequate attention must be given to the training of teachers and JFFLS facilitators in order to ensure quality of the training and adequate attention given to life skills.

JFFLS has proved a very valuable tool to address the particular needs of OVCs, and ensure access to services for this often forgotten group. The JFFLS programme in Mozambique has evolved into an important enterprise, whose impact has been assessed by strong, if anecdotal, evidence. Institutional enthusiasm for this initiative has been voiced at many levels. Success stories in which the JFFLS are taken over by the communities abound, demonstrating the relevance of the programme. Moreover, the pilot experience in Mozambique has been expanded to many other countries in Africa, clearly showing its potential for replication and adaptation to different settings.

In Kakuma the JFFLS was found equally relevant and important also for children of humanitarian concerns. The way that JFFLS have been implemented both in Kenya and Mozambique with strong local ownership have further demonstrated that innovative pilot initiatives have the potential to turn into successful national programmes embedded in local institutions and communities. An enabling factor for replication has show to be the success of pilot activities, adequate Government and policy attention and support and donor support for up-scaling of local initiatives.

3.3 Institutionalization of Farmers Led IPM in Pakistan (Region: Asia)

State and Impact of Pesticides Use in Pakistan

In Pakistan the pesticide consumption increased from a mere 665 metric tons in 1980 to 78,132 metric tons in 2003-04 (Agricultural Statistics of Pakistan, 2005). The role of private sector in promoting the production and use of pesticides was found tremendously high. The private sector also took full advantage of government's pesticide oriented policies. One of the key components of dramatic increase in pesticide use in Pakistan is related to very soft import and registration at the time, which allowed the generic compounds registered elsewhere, to be imported without field-testing.

Studies conducted under Pesticide Policy Project in Pakistan (2000) have estimated the environmental and social cost of pesticide use in 9 cotton growing districts of Punjab to Rs. 11941 million (US $ 206 m) annually. About 49% of this external cost was attributed to the pest resistance problems, while 29% to loss in bio-diversity and nearly 20% occurred to human and animal health. The damage prevention cost on residue monitoring and public awareness is less than 2% (UNDP 2001 and Khan *et al*. 2003).

Analysis proved that such a tremendous cost of pesticide use not only drains the exchequer, but also presents a growing threat to the people and environment of the country. It was concluded that chemical based control programme in crops has actually increased the pest problems, disturbed the agro-ecosystem and has killed the non-target and environment friendly organisms such as parasitoids, predators and birds. Disturbance in an agro-ecosystem led new pest problems through resurgence and resistance processes in the naturally occurring pest populations. It was understood that over and misuse of pesticides has led to tremendous economic losses and hazards to human health (Feenstra *et al.*, 2000; Orphal, 2001; Ahmad *et al.*, 2000). The results of pesticide policy analysis project and the initial input and suggestion of FAO-EU IPM Programme for Cotton in Asia led to institutionalization of an IPM programme in Pakistan.

IPM Research and Development in Pakistan

In Pakistan, research and development on IPM was initiated in 1971. However, concerted efforts to test approaches that reach farmers on large-scale, were initiated by PARC-IIBC station, Rawalpindi (now CABI Bioscience Regional Centre-Pakistan). A seven-year project on cotton bollworms, a three-year project on cotton whitefly, and an institutional three-year support project on IPM, funded by Asian Development Bank, were the first steps in this direction. Similarly, other IPM activities like introduction of natural enemies of sugarcane *Pyrilla* in Sindh and NWFP, cultural control of Gurdaspur borer in sugarcane, pheromones (methyl eugenol) to control fruit fly and effective & environment friendly use of pesticides against cotton pests, were successfully carried out on large scale by various researchers. A number of plant protection related institutes in the National Agricultural Research System (NARS) are involved in developing IPM technologies for major crops. An IPM technology comprising of cultural practices, resistant varieties, use of bio-control agents and selective use of pesticides was developed for managing rice pests in Pakistan (UNDP, 2001; Mustafa and Bhutta, 2001).

Many progressive farmers and Sugar Mills are successfully rearing and augmenting *Trichogramma* sp. and *Chrysoperla* sp. to control pests of cotton and sugarcane. *Chrysoperla* sp. has played an important role in the control of whitefly during the 2000-2001 cotton seasons in the Punjab where chemical control measures had failed. Control of *Helicoverpa* sp. has been demonstrated on small scale with *Trichogramma* sp. on chickpea, sunflower and cotton. Similarly, entomo-pathogenic nematodes have been identified that parasitize insects (Mustafa and Bhutta, 2001). Pesticides of plant origin like "Triaimol", "Nimboli" and "Nimbokil" have

been locally developed and are being used to control important pests (Jilani, 1999). Development and testing of IPM based technologies are continuing across the country in research institutions and universities.

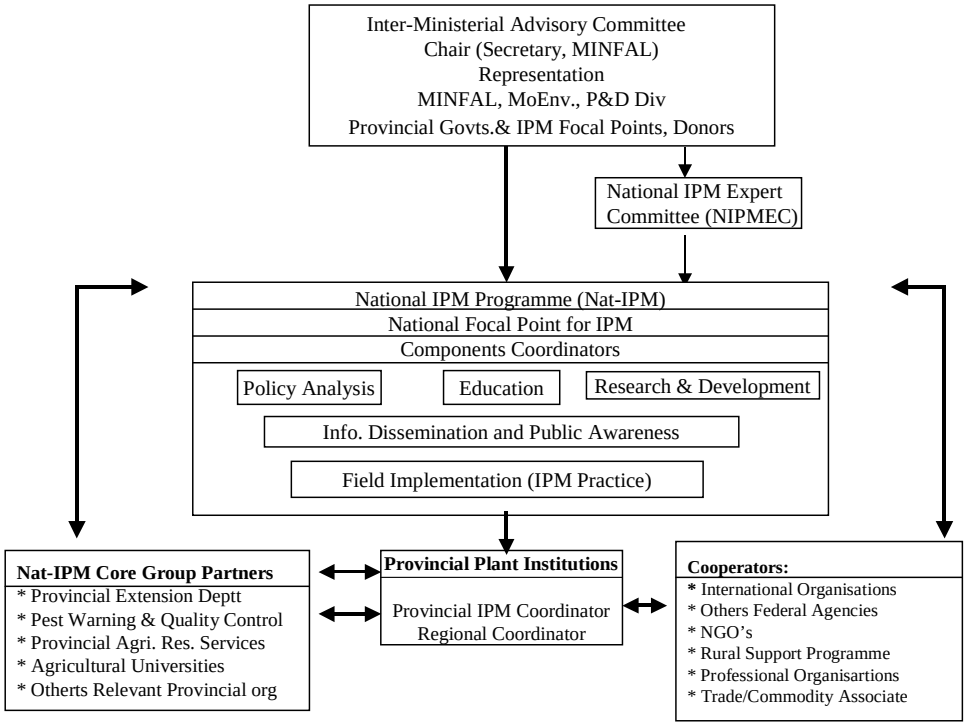
Introduction and Institutionalization of Farmer Led IPM in Pakistan

The FFS based IPM approach mainly stemmed in Pakistan, to address the pest problems on cotton crop, from a three year ADB-funded regional cotton IPM project started in 1994 for India, Pakistan and China, managed by IIBC. In 1995 ADB provided assistance to Pakistan for management of Cotton Leaf Curl Virus (CLCV). Under this project, assistance was provided to CABI Bioscience Pakistan Centre to do a pilot study and test suitability of ToF/FFS approach to IPM implementation on cotton crop in the Punjab Province. The field research carried out in the cotton zone of southern Punjab during 1997 proved that it is possible to reduce insecticide applications from 6 to 2 per season, under IPM decision making, whilst obtaining the same or even slightly higher yields. About 20% higher economic returns were estimated for adopting IPM based pest control on the cotton crop. The basic aim of the pilot project was to develop a training curriculum specific to the field situation of Pakistan for the benefit of extension staff and farmers. Under this project, one season long Training of Trainers/Facilitators (ToT/F) and 10 Farmers Field School (FFS) were conducted. The 23 Agricultural Officers as resource trainers and 250 participating farmers conducted studies at each FFS site to facilitate decision for demonstration of IPM and farmer practices (CABI Bioscience, 2001).

Unlike other regional countries the IPM was not institutionalized in Pakistan until 2000. It was identified as a key element of sustainable agricultural development in the Policy and Strategy for Agriculture developed by Government of Pakistan as part of its response to increasing misuse/overuse of pesticides and their negative impacts on the society in the country. An analysis of pesticide policy through a UNDP-FAO Policy Reform Project paved the way for establishment of a National IPM Programme in December 2000 and provided instruments to scale up the farmer-led IPM through integration of international and national efforts on various fronts (UNDP, 2001; Mustafa and Bhutta, 2001).

The National IPM Programme is led by the National IPM Coordinator and Focal Point for IPM as the overall Coordinator. The programme is based on five components; i) policy analysis, ii) education, iii) information dissemination & public awareness, iv) research & development and v) field implementation of IPM practices (Fig. 3). The programme works under the guidance of IPM Inter-Ministerial Advisory Committee (IPM-IMAC) and is technically supported by the National IPM Expert Committee (NIPMEC). It has close liaison with NIPMEC members, Provincial IPM Coordinators, relevant federal and provincial research and extension departments, committees and IPM units, NGOs and the donor agencies.

Fig. $$$. Organization and Coordination Flow Chart of the National IPM Programme



Experience and advancement of Farmer Led IPM in Pakistan

The National IPM Programme has executed the following initiatives with international support in an integrated strategy to forge a unified sustainable IPM Programme:

i) FAO-EU Regional Project "Cotton IPM Programme for Asia" (2000-2004).

ii) ADB-FAO Pakistan Project "Cotton IPM Programme" (2002-2004).

iii) AGFUND-FAO Pakistan Project "**:** Pesticide Risk Reduction for Women in Pakistan (Pilot initiative within the FAO/EU Programme for IPM in Cotton in Asia" (2002-2003).

The FAO-EU Regional Project and ADB-FAO project were aimed to build the capacity of the Field Facilitators of Agricultural Extension Department and Farmers in growing healthy cotton crop through Farmer Field School approach, while the project on pesticide effect on women seeks to initiate women's participation in cotton IPM. By the end of 2004, a total of 425 IPM facilitators (8 women), coming from government service (Agriculture Officers and Field Assistants of the Department of Agricultural Extension and staff of research institutions), non-government organizations (NGOs) and post-graduate students from agricultural universities, had been trained in 12 ToF courses. In addition, the project held five farmer ToF courses (FToF), of which two were NGO funded, training 109 IPM FFS alumni (7 women) as farmer facilitators. A total of 525 FFSs and farmer-to-farmer field schools (FTFSs) were carried out: 150 as practice FFSs, 32 as practice FTFSs, 276 regular FFSs and 52 FTFSs. Of these 15 were implemented through NGOs. The FFS were started in 2001 and FTFSs in 2003. The number of FFSs and FTFSs increased from 25 in 2001 to 270 in 2004. The total number of farmers to receive training was 12,999 (231 women) by the end of the 2004 cotton season (UNDP, 2005, Ooi *et al.,* 2004).

Curricula for ToF, FToFs and FFS were designed and improved in yearly curriculum development and improvement workshops. Annual facilitation skills enhancement workshops were held, as well as a planning and refresher workshop in 2003 to upgrade facilitators' skills (UNDP, 2005).

In many IPM villages farmer clubs or farmer associations were established, some of which were formally registered as welfare organizations. In addition, some IPM facilitators, farmer facilitators and women facilitators formed facilitators' associations. The project assisted in holding three farmers' congresses in 2004 to improve the contacts and exchange of ideas and experiences among different farmer groups. The IPM programme also conducted two workshops on community and leadership management skill in Punjab and Sindh to enhance the capacities of the farmers' organizations (UNDP, 2005). In 2004, five of the IPM Facilitators Associations were given contracts by donors to implement 80 FFS in cotton (Ooi *et al.*, 2004).

A short-term impact assessment of these projects carried out in 2003 showed a better cotton yield (30%), as well as marked reduction in the cost of pesticides (55%) and fertilizer inputs, enabled FFS farmers to achieve higher gross margins (US$ 391/ha) than those of non-FFS (US$ 151/ha) and control farms (US$ 25/ha). Impact on biodiversity and bio-safety indicators showed that total doses of pesticide chemicals were largely reduced (43%) on FFS farms, with much higher reduction in the use of highly toxic pesticides (54%). In addition the study showed a significant reduction in environmental risks, increased agricultural biodiversity, and enhanced social and decision-making skills and organizational capacity among FFS farmers. On FFS farms an increase of 23% was estimated in the use of sources of technical knowledge, along with significant increase in recognition of pest and predators, the decision-making capacity and field experimentation. Full attendance of FFS sessions by farmers contributed towards learning skills and the making of independent decisions for additional economic gains. FFS farmers joined community organizations in greater numbers (33%) during the post-FFS period (UNDP, 2005; Khan et al., 2005). A significant increase in the net contribution (46%) of cotton to net house hold income at FFS farms assisted in reducing the poverty profile. Poverty incidence in FFS farms was reduced from 71% of household below the poverty line to 55% (UNDP, 2005; Khan and Ahmad, 2005).

Simultaneous with the donor funded projects a five year National IPM Project was approved by the Government of Pakistan in 2003 and was initiated in July 2004. The National IPM Programme through this project, is facilitating the reviews of plant protection and IPM policy issues, on as and when required basis or as advised by the Inter-Ministerial Advisory Committee, and is providing feed back for onward recommendation to the Government of Pakistan. Through its component of education, the programme is introducing/promoting IPM philosophy in educational institutions by pursuing respective departments for inclusion of IPM policies and syllabi in schools, colleges and universities. It involves training of teachers in FFS-based IPM philosophy. It is enhancing public awareness and establishing IPM information network (NIPMIN) through holding of seminars, awareness workshops, issuing of quarterly newsletters and establishing a website, to provide updated science based information to the stakeholders. The National IPM Programme is promoting and coordinating research & development in IPM including studies of various agro-ecosystems and indigenous knowledge and under this component there is training of public sector professionals and students in IPM research and development.

The National IPM Programme is coordinating with various national agencies, NGOs such as Rural Support Programmes and international organisations for promoting effective IPM practices in the country. Nat-IPM has been instrumental role in institutionalizing IPM as a programme beyond pest management. FFS-based IPM approach has successfully switched from project to programme phase and set a stage, for entering into a movement state. It has proven to be a programme of capacity building, empowerment particularly of women, poverty reduction and pesticide policy reforms. Establishment of a network of community organizations at regional and national levels has paved the way to develop effective linkages between research, extension and development agencies. A core team of highly skilled expert facilitators has been trained to expand programme from cotton IPM to cropping system based community IPM.

National IPM Programme in the expansion phase has broadened the use of FFS approach beyond plant protection into mainstream extension; developing FFS farmers as expert trainer groups that can continue to generate new knowledge in a self-reliant manner and to undertake several other developmental initiatives on agri-business lines. In order to achieve these goals, programme has experimented with many concepts to achieve the sustainability and social equity goals. All these concepts are pilot tested that include: (a) expanding IPM approach from commodity orientation to system focuses; (b) addressing gender involvement in season long trainings; (c) institutionalizing farmer to farmer knowledge/skills transfers; (d) integration of participatory experimentation and community development concepts; (e) sustainable use of services of IPM facilitators for promoting farmers science; (f) establishing a net work of FFS based community organizations; (g) experimentation to test new hypothesis with FFS-alumni groups; (h) private-public partnership to run ToF and FFS; (i) involvement of FFS-groups into large scale testing of pheromone technology; (j) linkage establishment with development projects to run machinery pools; and (k) family IPM experimentation through establishing children ecology clubs, Women Open Schools and Farmers Field Schools. The Programme has now set goals ahead that are (a) advocacy of participatory IPM (PIPM) among senior policy makers level; (b) development of capacity of mainstream extension in PIPM on depressed cropping systems; (c) development of capacity of higher and secondary school education to imbibe health, environmental and ecosystem concepts; (d) development of capacity within rural women folk to protect communities and environment from pesticide hazards; (e) refinement of FFS training process for sustainability and technical backup in quality assurance; (f) development of FFS based technological packages and refinement of facilitators roles; and (g) pilot testing of training modules on enterprise development through public, private and NGOs partnership.

Challenges

The lessons learned and experiences gained from the farmer led FFS-IPM approach have raised several questions in the minds of programme managers as well as donors. These concerns are related to maintaining quality of farmers' education, sustainable use of scientific knowledge by the farmers and continuing policy level support for achieving environmental goals and gaining targeted growth in the production of food and fiber crops.

The resources available under the FAO-EU IPM Programme for cotton in Asia dried down after a crucial start-up, until that the Master Facilitators (key factor in FFS-Based IPM processes) cadre was developed to a limited scale. The on-going national and provincial IPM projects have limited capacity to expand Master Facilitators cadre for backstopping and quality monitoring of ToF and FFS presently implemented by various public and private sector organizations. The existing scale of national needs demand a continuous support for; i) ensuring the sustainable use of services of IPM facilitators for promoting farmers' science, ii) establishing a network of FFS-based community organization or FFS alumini through conducting refresher courses, organizing farmers' congresses etc. iii) backstopping and process monitoring of ToF and FFS.

The initial approach was commodity (cotton) based stressing the need for holistic system based approach. The system based experiments are under way by CABI Bioscience Center implementing in Sindh and Punjab Community IPM project being executed by Punjab Agricultural Extension Department and Punjab Rural Support Programme (PRSP). Mix FFS (male and female), family IPM and children ecology club concepts are pilot tested in Khairpur Sindh, Bahawalpur and Vehari districts of Punjab. These need to be validated for up scaling by other FFS-IPM practitioners.

Rapid scaling up of FFS-based IPM approach with government extension agents is difficult, as there are limited numbers of public sector extension employees in relation to the 5 million farm families. Activist of village based community organization is another option for augmenting this facilitators' cadre. Similarly, a cadre of farmer facilitators could also be developed, as successfully experimented in Bahawalpur (Kissan Welfare Association) and

Khairpur (Farmers Facilitators Organizations) districts. These experiences need further synthesis, resources allocation, institutionalization and expansion in other areas.

Pesticide policy analysis (UNDP, 2001) shows drastic reduction in the real process/cost of pesticides overtime in the present Generic era that induced irrational pesticide use. Imposition of CESS on synthetic pesticides was proposed and could not be imposed as yet for internalizing health hazards and environmental damages through promoting IPM-related measures.

Impact assessment was an integral part of the FAO-EU IPM Programme for cotton in Asia. The baseline survey was conducted during July 2002 immediately after the formation of the FFS training groups and information was collected about the 2001 cotton crop. The post FFS-impact survey was conducted during the 2003 cotton season. The long-term impact assessment of FFS-based IPM approach was due by Kharif 2006 that was essentially built in the programme. Efforts have been made and although delayed, the long term impact assessment studies are being executed now through the Social Sciences Division of PARC.

Establishment of Center of Excellence for Farmers' Education

Research in farmers' education through informal mediums for discovery based learning is important for realizing technical, allocative and economic efficiencies in agricultural production. Khan and Iqbal (2005) has shown that experimentation conducted in educating farmers in best cotton crop management practices proved successful in reducing cost of production in-efficiency by 7% (from 29% to 23%) beside other environmental and health gains.

The public sector research is striving to develop appropriate technological packages for the end users. Technology designing processes are proved to be very demanding to the needs of diversified type of end users including farmers with different capacities. The required mechanisms are lacking in the research establishments to tailor technologies according to the client needs. Even if appropriate technologies are available with research system, farmers as key stakeholders don't have the required capacity to validate these technologies scientifically. The facilitators perform key role in transferring skills among farmers through informal education processes. He serves as catalyst between research and extension to transform technical knowledge into practicable activities that could be experimented by the farming communities. The facilitators trained in Pakistan include personals from public sector extension departments, local NGOs, village activists, young graduates and literate farmers. There is strong need to institutionalize this approach to maintain the quality of the farmers' education. Center of excellence of farmers' education is proposed to:

i) Carry out research on scaling up and scaling out the FFS methodologies

ii) Development of training modules for different level of facilitators

iii) Experiential learning research

iv) Certification for cadre of facilitators based on facilitation skill assessment

v) Knowledge management and utilization.

The functional autonomy (financial, administrative and interactive) of the proposed center of excellence would help to achieve agricultural sector development goals pertaining to value added high tech production on business lines. The establishment of the Center has been approved as part of the reform agenda of Pakistan Agricultural Research Council and steps are underway to execute the programme.

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